PURDUE SCHOOL OF ENGINEERING AND TECHNOLOGY 2012-2013 ACADEMIC YEAR ASSESSMENT REPORT

Prepared by the School's Assessment Committee and Karen Alfrey, Chair

July 8, 2013

Introduction

The Purdue School of Engineering and Technology, IUPUI (E&T) continues its tradition of reporting its outcomes assessment activities by department or (where appropriate) by academic program. The assessment activities of most programs in the school are guided by the discipline-specific accreditation requirements of ABET, Inc. (http://abet.org/, formerly the Accreditation Board for Engineering and Technology), which accredits our engineering, technology, and computing programs; of the National Association of Schools of Music (NASM, http://nasm.arts-accredit.org/), through which the department of Music and Arts Technology is accredited; and of the Council for Interior Design Technology (CIDA, http://www.accredit-id.org/), the accrediting body for our Interior Design Technology program. The Organizational Leadership and Supervision (OLS) program, which is not accredited at the program level, uses the campus's Principles of Undergraduate Learning (PULs) as their framework for program assessment. Technical Communications (TCM) offers a certificate program and a recently-established Bachelor's degree in Technical Communication, as well as providing supporting coursework (and assessment data on student learning outcomes in those courses) for many of the programs in the school.

School Assessment Processes

The program outcomes defined by ABET, NASM, and CIDA to describe the knowledge, skills, and habits of mind expected of successful graduates of these programs cover the same broad areas as IUPUI's Principles of Undergraduate Learning, but with more specificity appropriate to the needs of each discipline. (ABET outcomes for engineering programs, for example, include several outcomes that could be considered specific examples of Quantitative Skills, one of the PULs.) Thus, by focusing on attainment of discipline-specific outcomes, programs are assured of meeting the more broadly-defined PULs.

Student Learning Outcomes for each undergraduate program are published in the Bulletin: http://www.iupui.edu/~bulletin/iupui/2012-2014/schools/purdue-engineer-tech/undergraduate/student_learning_outcomes/index.shtml. For engineering programs, ABET defines eleven core outcomes (commonly designated as "a through k" in keeping with ABET terminology):

> Upon completion of this program, students will be able to demonstrate:
> a. an ability to apply knowledge of mathematics, science, and engineering.
> b. an ability to design and conduct experiments, as well as to analyze and interpret data.
> c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
> d. an ability to function on multidisciplinary teams.
> e. an ability to identify, formulate, and solve engineering problems.
> f. an understanding of professional and ethical responsibility.
> g. an ability to communicate effectively.
> h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

i. a recognition of the need for, and an ability to engage in life-long learning.
j. a knowledge of contemporary issues.
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Some programs may define additional program-specific outcomes appropriate to their discipline. For baccalaureate degree programs in engineering technology, the eleven core "a through k" ABET outcomes are:

Upon completion of this program, students will be able to demonstrate:
a. an ability to select and apply the knowledge, techniques, skills and modern tools of their disciplines to broadly-defined engineering technology activities;
b. an ability to select and apply a knowledge of mathematics, science, engineering and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
d. an ability to design systems, components or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
e. an ability to function effectively as a member or leader on a technical team;
f. an ability to identify, analyze and solve broadly-defined engineering technology problems;
g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
j. a knowledge of the impact of engineering technology solutions in a societal and global context; and
k. a commitment to quality, timeliness, and continuous improvement.

Each undergraduate course taught in the school has identified one or more emphasized PULs, as well as any discipline-specific outcomes emphasized in the course. Based on these defined areas of emphasis, specific courses may be targeted for assessment of a given outcome. The campus-level PUL assessment process, which calls for assessing PULs in every undergraduate class on a 5-year cycle, provides supplemental data on learning outcomes and a check on the validity of our program-specific outcomes data. The bulk of program assessment is administered and performed at the department level, with the school assessment committee providing a mechanism for sharing resources and best practices, as well as disseminating information and guidance on new campus-level assessment processes. An example of the mapping between discipline-specific outcomes and PULs is shown in the table on the next page.

Prompted by the establishment of Principles of Graduate Learning at IUPUI, graduate programs in the School of Engineering and Technology have likewise established student learning outcomes, published in the Bulletin: http://www.iupui.edu/~bulletin/iupui/2012-2014/schools/purdue-engineer-tech/graduate/student_learning_outcomes/index.shtml Due to the highly specialized, integrative

nature of graduate programs, assessment of these outcomes focuses primarily on the thesis (or final project) rather than on individual courses.

ABET/EAC Criteria #3 2011-12 Evaluation Criteria **Engineering programs must demonstrate that their students attain:**	**INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS PRINCIPLES OF UNDERGRADUATE LEARNING**							
	PUL 1 **Core Communication and Quantitative Skills**			**PUL 2** **Critical Thinking**	**PUL 3** **Integration and Application of Knowledge**	**PUL 4** **Intellectual Depth, Breadth, and Adaptiveness**	**PUL 5** **Understanding Society and Culture**	**PUL 6** **Values and Ethics**
	A	**B**	**C**					
(a) an ability to apply knowledge of mathematics, science, and engineering		X		X	X	X		
(b) an ability to design and conduct experiments, and analyze and interpret data		X		X	X	X		
(c) an ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability				X	X	X		
(d) an ability to function on multidisciplinary teams	X					X	X	
(e) an ability to identify, formulate, and solve engineering problems		X		X	X	X		
(f) and understanding of professional and ethical responsibility				X	X	X	X	X
(g) an ability to communicate effectively	X						X	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context					X	X	X	X
(i) a recognition of the need for, and an ability to engage in life-long learning			X	X			X	X
(j) a knowledge of contemporary issues				X		X	X	X
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X		X	X		

School Assessment Milestones

The Technical Communication program is now offering a BS in Technical Communication; the first TCM majors matriculated in Fall 2012.

The school's Engineering Technology programs, the accreditation of which is overseen by the ETAC (engineering technology commission) of ABET, are preparing for an accreditation visit in Fall 2013. The Biomedical Engineering Technology (BMET) program is seeking an initial accreditation; technology programs seeking re-accreditation include Electrical, Computer, and Mechanical Engineering Technology (EET, CET, MET); and Construction Engineering Management Technology (CEMT). In preparation for the upcoming visit, each program completed an extensive self-study detailing their assessment and continuous improvement processes and providing evidence that student learning outcomes are being attained. In addition to being submitted to ABET, copies of these self-studies are on file in the Dean's Office of the School of Engineering and Technology. These self-studies provide additional details and analysis of the assessment processes and outcomes summarized in this report.

In January 2012, IUPUI and Ivy Tech were selected to participate in the AAC&U Quality Collaboratives project, an initiative to develop best practices for the seamless articulation and transfer of coursework across institutions using the AAC&U's Degree Qualifications Profile as a framework. Building on existing ties established through the E&T Assessment Committee, faculty from both institutions are working together to build a common assessment framework to ensure that students transitioning into the junior year of the Mechanical, Electrical, Computer, and Energy Engineering programs at IUPUI are equipped with the skills and knowledge they need to succeed, regardless of whether they completed their first two years at IUPUI or in the new pre-engineering sequence at Ivy Tech. In May 2013, IUPUI and Ivy Tech engineering faculty and staff came together to evaluate samples of student work at the freshman and sophomore levels and, using the Dynamic Criteria Mapping (DCM) process, to begin to construct a framework of characteristics that demonstrate appropriate competence at each level. The feedback generated at that workshop will be used to develop a rubric that can be used to assess student work with an eye toward determining whether a student is sufficiently prepared to advance from the sophomore year (or 2-year institution) to the junior year at a 4-year institution.

The E&T 2012-2013 Assessment Committee

This year the E&T Assessment Committee was chaired by Karen Alfrey, Director of the Undergraduate Program in Biomedical Engineering. The members of the 2012-2013 committee were the following:

Karen Alfrey, Biomedical Engineering
Mark Atkins, Ivy Tech
J. Bradon Barnes, Ivy Tech
Stanley Chien, Electrical and Computer Engineering
Jerome Clark, Computer and Information Technology
Elaine Cooney, Engineering Technology
Michael Hall, Ivy Tech
Stephen Hundley, Technology Leadership and Communication
Alan Jones, Mechanical Engineering
Betty Klein, Design and Communication Technology
Roberta Lindsey, Music and Arts Technology
Emily McLaughlin, Design Technology
Danny King, New Student Academic Advising Center
Corinne Renguette, Technical Communications

David Russomanno, Dean
Jane Simpson, Electrical and Computer Engineering
Elizabeth Wager, Organizational Leadership and Supervision
Bill White, Engineering Technology
Jennifer Williams, Career Services
Wanda Worley, Interim Associate Dean for Undergrad Programs
Paul Yearling, Engineering Technology

Departmental and Program Annual Reports for 2012-2013

The 2012-2013 departmental and program assessment reports included in this school report represent the collected works of the following:

Biomedical Engineering (BME)
Interior Design Technology (IDT)
Biomedical Engineering Technology (BMET)
Electrical Engineering Technology (EET) and Computer Engineering Technology (CpET)
Mechanical Engineering Technology (MET)
Organizational Leadership and Supervision (OLS)
Technical Communication (TCM)

The table below outlines reporting for the school over the last three years. Previous years' reports are available at http://www.planning.iupui.edu/43.html under "School Assessment Reports".

Programs		2009-10	2010-11	2011-12	2012-13
BME		x	x	x	x
EE/CE				x	
ME/EEN		x	x		
MSTE				x	
CIT		x			
CGT		x	x		
ART			x	x	
IDT			x	x	x
TCM		x			x
OLS				x	x
ECET		x	x	x	x
MET				x	x
BMET		x			x
CEMT		x	x	x	x
MAT		x	x		
NSAAC		x			

DEPARTMENT OF BIOMEDICAL ENGINEERING 2012-13 ASSESSMENT REPORT NARRATIVE
Written May, 2013

The undergraduate Biomedical Engineering program received its initial program accreditation in Fall 2011. The ABET accreditation process happens every six years for programs with no significant shortcomings identified; thus, our next accreditation visit will be scheduled for Fall 2016, with the accreditation decision of the commission announced by Fall 2017. Consistent with this schedule, the BME department has adopted a six-year cycle of assessment activities. Although learning outcomes are being measured on an ongoing basis and minor improvements made at the individual course level, the next department-wide round of outcomes data collection and analysis is not scheduled until the 2014-15 academic year. The major assessment activities of the 2012-13 academic year instead focused on more indirect measures of program effectiveness, as well as an initial review of assessment data for the BME Master's program.

Student Satisfaction Survey

In Spring 2013, an undergraduate Student Satisfaction Survey was administered in three required BME classes (one each at the sophomore, junior, and senior level). 20 sophomores (54%), 29 juniors (100%), and 21 seniors (100%) completed the survey; the results are shown in Table 1, along with the results from 2010.

	2010	2013
I am satisfied with the quality of advising in the BME Department.	4.1	3.9
I am satisfied with access to the advisor in the BME Department.	4.3	4.0
I am satisfied with advising on job placement and graduate programs.	3.2	3.5
I am satisfied with the current opportunities to get to know other students in the BME Department.	3.7	3.8
I am satisfied with the current opportunities to get to know the faculty members in the BME Department.	3.4	3.7
I am satisfied with the level of opportunity to do research with the faculty members in the BME Department.	3.1	3.5
I am satisfied with the hours that the BME office is open.	4.0	4.0
I am satisfied with the frequency of scheduling of BME courses.	2.9	3.6
I am satisfied with the way that BME courses are scheduled (time, day, length of classes.)	3.4	3.7
I am satisfied with the quality of instruction in BME **lecture** courses.	3.8	4.2
I am satisfied with the quality of instruction in BME **laboratory** courses.	3.3	3.9
I am satisfied with the amount of available help outside the classroom and laboratory.	2.9	3.9
I am satisfied with the quality of BME laboratory experiences.	3.5	3.8
The BME classes and laboratories are conducive to learning.	3.8	4.0
I am satisfied with the quality of the textbooks in BME courses.	2.8	3.3
I am satisfied with the computers and software in the BME course laboratories.	3.8	3.9
I am satisfied with the laboratory equipment (exclusive of computers and software) in BME course laboratories.	3.8	3.9
I am satisfied with the amount of student access to the BME course laboratories.	3.8	4.1
Scale: 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree		

Table 1: Results of the 2013 BME Undergraduate Student Satisfaction Survey

Overall, students are reasonably satisfied with their experience in BME, with the average response on every question showing at least mild agreement that "I am satisfied with…" these aspects of the BME undergraduate program. Furthermore, the results showed significant improvement in the three primary areas of concern identified in the 2010 survey:

- The average response to "I am satisfied with the frequency of scheduling of BME courses" increased from 2.9 (slight disagreement) to 3.6 (somewhat stronger agreement). Although the scheduling frequency of required undergraduate courses has not changed since the prior survey was administered (with almost all courses being offered only once per year), two significant changes have been made to help address student dissatisfaction. First, a section on course schedule planning was added to the BME Undergraduate Handbook, with explicit instructions on when certain prerequisite courses must be completed in order to stay on-track in the program; this information was also communicated to Freshman Engineering advisors, to ensure that choices made by students before entering the BME program in the sophomore year do not throw up scheduling roadblocks. In addition, in the last two years the department has formalized and prominently publicized the ongoing schedule of 500-level courses, which form a major source of depth area electives for the undergraduates. Publicizing this ongoing schedule allows students to do more effective long-term planning.

- Student satisfaction with the amount of available help outside the classroom and laboratory has seen significant improvement since 2010 (with the average of responses increasing from 2.9 to 3.9). In order to increase the availability of help outside the classroom, for the last two years the department has coordinated the scheduling of TA office hours so that available help and tutoring is available throughout the week; in addition, the schedule includes information on other areas (beyond just the class to which the TA is assigned) in which each TA feels comfortable giving additional assistance. Furthermore, TAs are encouraged to hold their office hours in the Undergraduate Teaching Laboratory, a space that many students use for studying between classes. Even among students who do not take frequent advantage of TA office hours, there is a greatly increased perception that help is available if they need it.

- There has also been a modest improvement in overall student satisfaction with textbooks (with average scores increasing from 2.8 to 3.3); however, it remains the area of lowest satisfaction and is an ongoing concern (for faculty as well as students). Unfortunately, because Biomedical Engineering is still a relatively young field compared to the more traditional engineering disciplines, there is not yet a critical mass of well-written, discipline-specific undergraduate textbooks available. We continue to monitor the textbook landscape and adopt new, more effective texts as they become available.

Overall, the survey demonstrated at least modest improvement in every area *except* satisfaction with student advising, which on the 2010 survey was the area of highest satisfaction (with average scores of 4.1 and 4.3, respectively, on satisfaction with quality and availability of advising). Both these scores have fallen slightly (to 3.9 and 4.0, respectively). These scores still suggest overall satisfaction with advising, but may reflect some dissatisfaction that the increased size of the undergraduate program has necessitated a change in the structure of advising. Previously, all students received primary advising from the director of the undergraduate program; however, beginning in Fall 2010 the advising load has been shared between the program director and the three other faculty members who serve on the BME Undergraduate Committee. This may give students the impression that advising is less efficient (particularly in those cases when another advisor requires additional input from the program director) and less consistent (although the Undergraduate Committee works closely together to ensure consistency).

In addition, the increased demands on advisor time and energy that come from running a growing program (which has seen an increase from about 60 to about 100 students in the program since 2010) means that it is now much harder to accommodate drop-in appointments than it was in the early days of the program. However, even with the challenges of a growing program, we continue to work hard to ensure that our students receive useful and timely academic advising.

Transfer Student Roundtable

This year is the first time we have had a significant cohort of students from universities with which we have (or are developing) 2-2 or 3-2 programs: a total of six students from three such programs took a combination of sophomore- and junior-level courses this year. In order to stay on-track to finish the degree in two (or two and a half) years, in the fall these students took the sophomore Biomeasurements class (BME 22200) plus many (or all) of the 1st-semester junior BME classes – including some for which BME 22200 is normally a prerequisite. They all made satisfactory progress, but the workload was a major challenge for many of them. This Roundtable, attended by three of the students (representing two partner universities) provided an opportunity for them to provide some feedback about the experience and offer advice on what worked well, what they wished they had done differently, and what we as a department should be doing in terms of communicating with incoming students and our partner institutions about expectations and workload, or providing other appropriate support and guidance.

The students identified several areas of **strength** for the department and their overall experience:

- All participants agreed that they found their instructors to be understanding about the differences in background of recent transfer student and helpful in providing additional help and background information when necessary.
- The participants were impressed at how knowledgeable their instructors were, and that instructors clearly were experts in their subject areas; they stated that "it is hard to find a question [the instructors] can't readily answer."
- The participants also noted that instructors were very willing to offer additional help and insights into problems from other classes, when relevant; for example some students working on a project in a junior-level class found that the instructor of the sophomore-level prerequisite class was very willing to listen to them discuss ideas on how to approach the problem and offer hints on additional points to consider.

In addition, the students identified several **challenges** to be addressed:

- Participants noted that going from a liberal arts-focused (or other non-engineering) institution to having four engineering classes in the first IUPUI semester is a huge mental adjustment; even with strong backgrounds in math and physics, these students found that "engineering makes you think in a whole new way".
- In addition, students who complete their less-rigorous coursework (e.g. freshman seminars, general education electives) at another institution and then start immediately into a very challenging courseload in their first semester at IUPUI have lost the GPA cushion that those lower-level classes provide. All three participants had been considering graduate school but ended up with GPAs below 3.0 in their first semester; they were concerned that even though their overall GPAs were well above 3.0, the low IUPUI GPA might kill their chances of getting into a competitive program.
- The overall consensus seemed to be that completing the IUPUI BME curriculum in only two years after two (or even three) years at another institution was an unrealistic goal except for the most talented and motivated students.

Based on this feedback, the IUPUI engineering advisors who work with transfer students considering a 2-2 or 3-2 plan have been very up-front that planning to spend an additional semester is probably the most realistic option. In addition, beginning in Fall 2013 we will be adjusting the sequencing of our sophomore classes in a way that may help alleviate the challenges of the first semester for incoming students on the 2-2(.5) plan. We will continue to monitor the progress of these students and look for additional ways to help foster their success in the BME program.

Assessment of the BME Master's Program

The main means of assessment of the BME Master's program has been assessment of the thesis (or project, for students pursuing a non-thesis Master's). Since 2004, members of the thesis committee have been asked to rate the defending candidate on a range of factors related to the quality of their research work, written thesis, and oral defense. However, the data generated from this assessment have not been systematically evaluated. This year the department examined the results overall and as a function of time. The averages are shown in the following table (where n=number of students evaluated. On average, each student was evaluated by three committee members. Note that due to some changes in process, no data was collected between summer 2010 and summer 2012, even though several students graduated during that time period.)

	2004-06 (n=14)	2007-09 (n=12)	2010-13 (n=8)	All years
Problem Identification: The quality of the written description of the problem investigated	4.36	4.11	4.13	4.22
Literature Survey: The quality of the literature survey conducted for the thesis or project	4.02	4.05	4.00	4.03
Creativity: The degree to which creativity was demonstrated in the solution of the problem	4.06	4.03	4.39	4.13
Use of Engineering Principles: The soundness of the engineering principles used and understood	4.14	4.17	4.48	4.23
Research Quality: The quality of the investigative research demonstrated by the student	4.32	4.27	4.43	4.33
Collection, Analysis, and Interpretation of the Data: Completeness and quality of the data collection	4.10	4.20	4.26	4.17
Completeness of the Research: The degree of completeness of the research work	4.24	4.19	4.36	4.25
Effectiveness of the Written Report	4.06	3.91	3.95	3.98
Effectiveness of the Oral Presentation	4.39	4.29	4.09	4.29
Scale: 1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent				

Overall, these results indicate that student work is rated at least "Very Good" in every category except "Effectiveness of the Written Report", where on average it falls just shy of this level of performance – a not unexpected result consistent with the skill-set of the typical engineer. Encouragingly, quality of student work seems to have made positive strides in several areas, particularly in Creativity and Use of Engineering Principles, but also including Research Quality; Collection, Analysis, and Interpretation of the Data; and Completeness of the Research. One possible cause for concern is the falling scores in Effectiveness of the Oral Presentation. It is not clear whether this change represents a significant decrease in student performance, or an increase in evaluator expectations. The department is cognizant of the need to give graduate students

more practice in presenting their research, however, and so is revamping the departmental seminar series to intersperse invited talks from more-established investigators with research talks from graduate students.

In addition, several of the graduate students in the BME program have taken it upon themselves to form a graduate student council with the goal of fostering a sense of community among graduate students in the department, as well as improving communication between graduate students and faculty. Process improvements suggested by this group at their inaugural meeting this spring include:

- Holding a seminar for new graduate students at the beginning of each semester at which faculty members give a brief overview of their research (possibly including lab tours) and discuss available/recommended classes, and returning graduate students serve as panelists to answer questions about the student experience
- Putting together a newsletter to disseminate information of interest to graduate students, including career updates from alumni, reminders of upcoming deadlines, and notices of relevant BME and other campus events
- Providing opportunities for alumni and current graduate students to share their experiences with newer graduate students through seminars/panel discussions

This student group will undoubtedly serve as an important ongoing source of feedback and suggestions on how we can improve the graduate program and graduate student experience.

DESIGN TECHNOLOGY ASSESSMENT REPORT
Interior Design Technology
Prepared by Emily McLaughlin
July 2013

Overview

The underlying objective of the Design Technology (DST) programs is to create multidisciplinary individuals with the necessary skills to enter the technology driven industries of the new millennium. Classroom knowledge links applications to the field through multiple service-learning activities with community partners, and student learning is regularly measured and assessed using Principles of Undergraduate Learning (PUL's) and Council for Interior Design Accreditation (CIDA) outcomes, as well as industry feedback.

During the 2012-2013 academic year, the Interior Design Technology program demonstrated the commitment to best practices by examining the IUPUI PUL's and CIDA professional standards, as well as evaluating assessment techniques used to measure learning outcomes related to these principles.

Assessment Initiatives

Over the past year, our program has participated in a multitude of new and ongoing activities relative to continuous assessment and evaluation of program inputs and outcomes. The following summarizes our most significant efforts, yet is not meant to be all inclusive.

1. Self-Study in Preparation for 2014 CIDA Site Visit

In March of 2013, Emily McLaughlin, the Director of Interior Design Technology, attended an 8 hour workshop dedicated to the CIDA accreditation standards and process in preparation for the 2014 site visit at IUPUI. After this workshop, all faculties in the program participated in a self-study during which every course in the program was examined for compliance with accreditation standards. Identification of strengths and gaps in curriculum has been a regular department meeting topic of discussion. The information gathered has been used to precisely identify key indicators of student outcomes.

2. Continued activity of the INTR Industrial Advisory Board

Our highly involved advisory board, consisting of both local and national authorities, provided invaluable criticisms through four, half-day retreats which were held over the past year. It is with their insight and recommendations that several aspects of our plans of study are consistently

scrutinized and revised to ensure validity with professional practice and to make certain that program goals remain current.

3. Senior Exit Surveys
Senior exit surveys continue to be collected and analyzed by the faculty and have brought about simple changes based on the recommendations of those who have completed our entire curriculum. As a result of student feedback, the faculty took steps to evaluate the printers and plotters available to our students, examine the courses which offer curriculum via hybrid and online formats, and make changes to program curriculum as needed.

4. Sophomore Advancement Review
The Interior Design Technology program continued to implement a sophomore advancement review. All students in the program who intend to pursue a B.S. degree must participate in this exercise, which involves the compilation of an academic portfolio and written statements, and the presentation of this work to a group of faculty who then deliberate without the student present. This exercise has proven to not only offer the student valuable criticisms regarding their academic progress, but also provide the faculty with an assessment mechanism which can be used to ensure that program outcomes are being met at the freshman and sophomore levels specifically.

5. Student Design Show
The Student Design Organization at IUPUI again held an annual show in March which showcased student work to the committee, including local design professionals who judged the work, providing valuable written and oral feedback to the students and faculty. This event provides useful guidance regarding professional expectations, in addition to allowing the faculty to view as a group the outcomes of student work across the entire curriculum. As a result of this event, presentation format of student produced work has been altered, and graphics skills/software needs of the program have been altered and increased.

6. Curriculum Revisions based on Indiana Legislation
The Interior Design Technology program, as a result of recent Indiana Legislation, was required to shrink from 127 to 120 credit hours, as well as revise the number of core 30 courses found in the curriculum. This required a series of meetings among faculty to examine the CIDA accreditation standards in conjunction with University requirements in order to comply with both.

7. Course Assessment Reports
Our faculty, both full-time and part-time, complete assessment reports each semester for every course in the program. These reports identify best practices and areas for improvement, as well as identify how the loop has been closed in the assessment process.

Technology Leadership and Communication

Chair: Stephen Hundley
Associate Chair: Marjorie Hovde
OLS Program Director: Elizabeth Wager
TCM Program Director: Corinne Renguette

Department Overview

The Technology Leadership and Communication (TLC) department was formed on July 1, 2012 as part of a technology department reorganization designed to more strategically align programs with similar curricular and assessment requirements, goals, and directions. TLC houses degree and certificate programs offered in Organizational Leadership and Supervision (OLS), Technical Communication (TCM), as well as OLS concentration courses in the M.S. in Technology graduate program. TLC spent year one developing strategic alliances, creating benchmarks, and establishing support and processes for the assessment of student learning and program learning outcomes for its existing certificates, B.S. in OLS, M.S. Tech, and the new B.S. in TCM – admitting its first degree-seeking students for the fall 2013 term.

First-year TLC Department Accomplishments

In support of excellence in teaching and learning, faculty and staff in the TLC department developed a new strategic plan, seeking feedback from current students, alumni of all programs, and strategic partners across the IUPUI campus and Ivy Tech. As a department, primary initiatives to excel in the delivery of instruction, the scholarship of teaching and learning, advising, and student services to support extraordinary student success include the following:

- Continue to use the *Principles of Undergraduate/Graduate/ Professional Learning*, ABET, Inc. criteria, and evidence-based best practices to guide our teaching
- Design and revise courses to meet demand and needs of various stakeholders and purposes (e.g., as courses in other programs' majors and certificates)
- Improve instructional design for traditional, hybrid, and online learning through training and resource development
- Measure program- and course-level learning outcomes and use assessment results for continuous improvement
- Develop and implement student success resources for retention, persistence, and increased graduation rates
- Apply for internal and external grants, especially in the areas supporting the Scholarship of Teaching and Learning (SoTL)
- Regularly seek feedback from program stakeholders and use this information to guide improvements at the program- and course-levels
- Develop and offer TLC courses that offer RISE designations
- Optimize our SoTL efforts including publishing and presenting at conferences
- Continue to offer individual tutoring through the TCM Writing Center
- Collect, analyze, and widely share results of student learning in TLC programs to aid in other programs' assessment, accreditation, and ranking efforts, as warranted

- Regularly perform external environmental scan of peer- and aspirant-level TLC programs to determine how our programs compare and/or are differentiated from others
- Work with E&T Student Services to recruit prospective students to TLC programs and to prepare them for careers
- Enhance effective advising structures and approaches for all TLC students
- Regularly meet with E&T Advising Center, UCOL, and other academic partners to promote understanding of TLC programs
- Work with various stakeholders (e.g., E&T Career Services, advisory boards) to identify, create, and promote career development opportunities (e.g., internships) for TLC students

In addition to a new strategic plan, the department completed a successful national search for tenure-track TCM Assistant Professor; formed and held meetings with three new TLC Advisory Boards (Student, Alumni, and Academic Partner) and are in the process of identifying members for a department-level Industrial Advisory Board; received final approval and launched the new B.S. in Technical Communication; proposed and was awarded a Learning Environments Grant for improving teaching technology in the OLS Leadership Learning Lab (ET 327); proposed and was awarded a Curriculum Enhancement Grant for development of a Graduate-level Certificate in Mixed Methods Research; proposed and received initial approval for a Graduate-level Certificate in Human Resource Development and submitted to Purdue for next level of review; proposed and was awarded a Curriculum Enhancement Grant for development of four online TCM courses; continued with new course development, and maintained impressive growth in student headcount and credit hour generation in both OLS and TCM.

Even with the tasks and responsibilities of creating processes and practices around a new department structure, faculty and staff in all TLC programs have participated in new and ongoing activities relative to continuous assessment and evaluation of program inputs and outcomes. The following summarizes assessment activities and efforts to assess student learning in OLS and TCM. Significant assessment efforts are in place for collecting data, creating benchmarks for measuring and comparing SLOs, and for making improvements throughout 2013-14.

Assessment in Organizational Leadership & Supervision (OLS)

OLS faculty and staff initiated an internal program learning outcome review during the spring 2013 semester with the goal of revising program level learning outcomes for the B.S. degree by the end of fall 2013. The B.S. program was revised in preparation for the new 30-credit hour IUPUI Common General Education Core. The OLS B.S. was already at 120.0 credit hours, but changes to the Science, Technology, Engineering, and Math Core Requirements were needed to include a 2nd science course. The computer competency requirement was removed as the majority of OLS coursework utilizes Oncourse and other learning technology that requires students to demonstrate computer skills. This requirement was replaced with 3.0 units of cultural understanding/awareness to fulfill the Common Core.

<u>2012-13 Program Learning Outcomes</u>

All full-time and part-time instructors worked with the OLS Undergraduate Program Director and their individual faculty course coordinator to populate a table reporting all current course

learning outcomes as well as the assignments and activities in support of each outcome. Faculty members were also asked to upload examples of activities, quizzes, assignments, projects, and exams used in the assessment of student learning for each class. A course project site was developed for each undergraduate OLS course to temporarily house the samples until program- and course-level learning outcomes are revised (fall 2013).

As part of the internal revision process, full-time faculty and staff are working collaboratively with the IUPUI Center for Teaching and Learning (CTL) to review, revise, and refine the list of expected competencies, essential questions, fundamental and powerful concepts, vocabulary, and SLOs associated with all courses offered (core and elective). From this foundational work, they will be able to revise program outcomes and better communicate expectations for learning to students. Each assignment or activity in support of student learning outcomes will include a rubric and will map directly to program learning outcomes. All new and existing faculty members and adjunct instructors will be asked to map their individual assignments and activities to the student learning outcomes table for their course(s) and post the learning map to their syllabus.

Undergraduate Survey

Surveys of two student groups were conducted during the spring 2013 term. OLS 10000 students were asked to compare online learning experiences to face-to-face and hybrid courses they have taken in OLS. The primary purpose of this survey was to:

1. Collect data on student preferences for course formats (fully online, hybrid, face-to-face), offering times (morning, afternoon, evening), and use of learning technology in Oncourse (forums, online chats, quizzes, exams, etc.).
2. Compare student preferences based on enrollment in the web section of OLS 10000 versus the face-to-face section of OLS 10000.
3. Collect formative program feedback on student needs.

The anonymous survey containing 25 open and close-ended questions was sent to all students enrolled in two sections of OLS 10000. The survey remained open from April 20 – April 28, 2013; 26 of 34 students responded. Response rates are noted below for the first 23 questions from students in the online class, as this is the data analyzed for preparing the fall 2013 schedule of classes. These data will be shared with adjunct faculty at the August 15, 2013 workshop.

1. First online college class	83.33%
2. First semester using Oncourse learning management system	77.77%
3. Found syllabus and class schedule in this course easy to understand	93.75%
4. Found documents in this Resources area useful for completing required assignments and activities	77.77%
5. Believe information in this Oncourse site is difficult to find	0.11%
6. Believe that online (synchronous) chats using Adobe Connect helped them better understand course topics	83.33%
7. [SLO] Believe that participation in this course helped them better understand their degree requirements	100%

8. [SLO] Believe that participation in this course helped them better understand the activities and behaviors of effective leaders	100%
9. Believe that participation in this course helped them reflect on their own leadership knowledge, skills, and competencies	94.44%
10. Believe that participation in this course helped them recognize characteristics of effective self-leadership	94.44%
11. Believe that studying strategic planning is a useful skill for students in a leadership program	100%
12. Believe that developing an individual strategic plan will help them achieve their academic goals	94.44%
13. Believe that developing an individual strategic plan will help them achieve their career goals	83.33%
14. Believe that this course has too many activities and assignments for a 1-credit hour course	50.00%
15. Believe that the ability to retake quizzes helped them better learn course concepts	77.77%
16. Believe that the ability to review recorded online chat sessions helped them better learn course concepts	94.44%
17. Prefer online courses that do not require synchronous chat discussions	66.67%
18. Prefer online classes to face-to-face classes	72.22%
19. Prefer short session classes to full term classes	88.88%
20. Prefer daytime online chat meeting options	44.44%
21. Prefer evening online chat meeting options	55.55%
22. Prefer weekend online chat meeting options	66.67%
Students believe that the following Oncourse Tools* help them learn best in an online class: (note students could respond to all Oncourse Tools that help them learn) Documents in Resources (18) Tests & Quizzes (17) Assignments (17) Messages (16) Syllabus (11) Forums (10) **All other current Oncourse Tools had 4 or fewer student responses.*	

Two open-ended questions also helped the instructor determine how well students could demonstrate the two core concepts (PUL 1A and 2) at the introductory level. In addition to assessment activities in the introductory course in OLS, faculty has been engaged in an intentional focus on assessment of prior learning for adult, veteran, and returning students. OLS has developed an online course (with a new non-credit bearing option) to provide adult and veteran learners with tools for creating an electronic portfolio to submit for evidence-based assessment of prior learning, continued to expand and revise its departmental review process, and engaged faculty and campus administrators in training, workshops, and discussions of next steps in developing campus policies and procedures to support prior learning assessment at IUPUI.

Assessment in Technical Communication (TCM)

Much like the OLS program, the TCM B.S. degree program was also revised to meet the requirements for the new 30-credit hour IUPUI General Education Common Core. TCM already included 3 credits of college math, but did not require a second analytical reasoning course, so 3 credits of electives were removed from the Science, Technology, Engineering, and Math

(STEM) Core and a required analytical reasoning course was added in the STEM section. All of the other Common Core requirements fit in in the electives of the pre-established sections, so the plan of study documents were revised to make the Common Core requirements clearer.

While there is no accreditation body for TCM, because of the service classes TCM provides to the School of Engineering and Technology majors and the ABET criteria to provide evidence that students have attained an ability to communicate effectively, TCM faculty once again participated in communication assessment activities for the purposes of supporting the ABET student learning outcomes. In addition, TCM part-time and full-time faculty members assess IUPUI's Principles of Undergraduate Learning (PUL) outcomes in all classes, and the full-time faculty created assessments for the learning objectives for several new courses that were developed for the B.S. degree as part of a Curriculum Enhancement Grant. Future goals include reviewing and revising the learning outcomes and assignments in other TCM courses, continuing to improve student outcomes in the areas of written and oral communication skills and PULs, and continuing to improve the assessment process overall.

Scheduled Assessment Activities

The TCM program continued its scheduled assessment activities during the fall semester of 2012 and spring semester of 2013. Fall 2012 semester activities focused specifically on the assessments for oral and written communication skills of the engineering students in support of the ABET outcomes; spring 2013 semester activities focused on assessment of PULs.

In fall 2012, a total of 20 student artifacts were collected for written skill assessment and a total of 12 artifacts were collected for oral skill assessment from TCM 36000, a course taken by engineering students. Data indicate that the students in TCM 36000 are continuing to perform adequately in oral communication. The previous assessment report indicated that improvement needed to take place in written communication in the areas of "content fits purpose and audience," "data and analysis are logical, sound, and sufficient," and "credit is given for work from other sources." These areas continue to need improvement. The course is being revised now to help with targeting improvement in these areas by changing the types of assignments.

To assess the oral communication skills in TCM service classes, TCM typically invites faculty members from the School to observe and assess student final oral presentations. Attendance has been quite low over the past two years. This past year, because of very low participation (only 2 faculty came to one class and assessed only 4 students), after the semester ended, TCM converted the assessment to an online format to allow for remote participation in the assessment process. The papers were uploaded to IUBox and the videos of final presentations were uploaded to a private YouTube channel for viewing, ideally intended for those who cannot make it to the classes. An online form was created, and a spreadsheet was automatically generated by the forms as they were completed by the assessors. The process was tested with TCM adjunct faculty members and was successful. The hope is that in future semesters, participation from the E&T faculty will improve since they won't need to be available only during the class times.

In spring 2013, using the online rubric of the PUL criteria provided by IUPUI, the course instructors independently ranked each artifact in their own course on the Major and Moderate Emphasis PUL categories. A transition in faculty and program director caused a delay in the

completion of the compilation of PUL results. The detailed 2012-2013 assessment report is in progress.

The goals from the previous assessment report included

- Find a way to encourage colleagues in both engineering and technology to participate in juries for the final oral presentations.
- Have the faculty members teaching the course do the PUL assessments each semester.
- Find a viable way to access the PUL assessment data.

While participation from engineering and technology professors declined this year, we hope the development of the new process of online assessment will encourage greater participation for next year. PULs were assessed by faculty teaching many of our classes. We hope to increase faculty PUL assessment each year. Managing the PUL assessment data continues to be a challenge we hope to overcome by next year.

Other TCM Assessment Activities

As part of the new B.S. Degree program, TCM faculty members were awarded a Curriculum Enhancement Grant to develop three new online TCM courses (TCM 23000, 24000, and 31000) and to turn one face-to-face course (TCM 35000) into an online course. With guidance from the Center for Teaching and Learning, specific objectives were outlined based on fundamental principles and key concepts, and assignments were created to meet those objectives. The objectives were also aligned with the PULs for each course. To assess the outcomes of these new courses, student self-assessment questionnaires were created using the Oncourse Tests and Surveys tool. Students will evaluate their own ability levels when the class begins and again after the course ends. PULs will be assessed online by the instructors teaching each course.

The three new courses were offered for the first time during the spring of 2013, and the fourth course will be offered during the fall of 2013. The courses were under-enrolled, but ran with the small numbers as a pilot. Students evaluated their ability levels relevant to the course objectives before they took the course and after they completed the course. Instructors also evaluated students based on the student's ability to meet the PULs for each course. We will use these results to continue to improve the courses each semester. In all three courses, student self-assessments of course objectives showed improvement. However, because of the small number of students, generalizations cannot be made with any degree of certainty. PUL data showed that most students achieved at least a result of "Effective" or better, although again, with such small numbers, it is difficult to generalize. Assessment results will continue to be monitored in these courses, and as the courses become better established, TCM faculty will continue to develop additional relevant assessment tools and modify the courses as needed based on those results.

At this point, there is no accreditation plan for TCM. However, future goals for the TCM program include reviewing and revising the learning outcomes and assignments in other TCM courses, continuing to improve student outcomes in the areas of written and oral communication skills and PULs, and continuing to improve the assessment process overall.

Department of Engineering Technology

Electrical Engineering Technology (EET), Computer Engineering Technology (CPET), Mechanical Engineering Technology (MET), Biomedical Engineering Technology (BMET), and Construction Engineering Management Technology (CEMT)

Prepared by Elaine Cooney and Karen Alfrey, 8/7/2013

The five programs listed above will be undergoing an ABET accreditation visit in October 2013. This will be an initial accreditation for BMET and a re-accreditation for the other programs. In preparation for this visit, each program has completed an extensive self-study detailing their assessment processes, analyzing data on attainment of learning outcomes, and detailing the ongoing plans and results of continuous improvement. This report highlights key findings from the self-studies; for full details, the complete self-studies are available through the E&T Dean's Office.

Assessment processes for ABET-accredited technology programs

For each ABET learning outcome (a-k), programs identify corresponding performance indicators; method(s) of assessing the outcome; classes (or other data sources) from which data will be drawn; frequency of data collection; and target for satisfactory performance. The table below shows an example of this process for Student Outcome 1 in the Biomedical Engineering Technology program:

Student Outcome 1: Demonstrate knowledge and skills in the use of electrical and/or computer components of medical equipment systems as encountered in the degree program's courses. Demonstrate a working medical vocabulary and knowledge of clinical safety requirements and regulations as encountered in the degree's program classes.

Performance Indicators	Method(s) of Assessment	Where data are collected	Year(s)/Semesters collected	Target for Performance
Students can determine voltages and currents for simple active circuits	Specific questions on final exam	ECET 157	Every semester	70% of students will score 70% or better on each question
	PUL data (1 & 3)	All classes	Every semester	70% of students will score 3 (effective) or 4 (very effective)
Students can successfully complete an assessment about NFPA 99 regulations	Four questions associated with NFPA 99 regulations on final exam	BMET 240	Every semester	70% of students will get all four questions correct

In each program, student outcomes data were compiled and analyzed. In the current cycle, none of the data raised any red flags about student achievement of learning outcomes: in almost all cases, data indicated that overall student performance hit the desired target. In the few cases in which targets

were not met, the results suggested a need for improvements in the assessment processes themselves, as highlighted below in the "Targets for Future Improvement" section.

ENT 2012-13 Assessment Highlights

Action Taken:	Peer Mentoring for key courses
Basis for Action:	Observed success of implementing teaching assistants in TECH 10500, Intro to Engineering Technology. Availability of CI-STEP grant funding for a department-wide initiative.
Date:	spring 2013
Results:	Hiring of 10 peer mentors within 5 different courses in our department. Formed the foundation of a mentorship program in our department that affected freshmen, sophomores, juniors and seniors in multiple departments. The final course grade average for the spring 2013 ECET 10700 class was higher than the previous two semesters.

Action Taken:	Required a C or better in BMET 240
Basis for Action:	The D W F rate in BMET 320 was very high.
Date:	fall 2011
Results:	spring 2013 Dramatic improvement in the performance of BMET 320 was observed and documented. This was noted in an email message from the instructor regarding mid-term grades: "The class did very well. The average grade was 86.8. The range was 94-69. Without the 69, the average was 88.3 and the range was 94-82. Steve xxxx was the low grade. He came to see me today with great concern. His other grades are not stellar, but I think he can pass if he does well the remainder of the term. I think the scores are greatly improved."

Action Taken:	Electronic Faculty Reflection Packet
Basis for Action:	The *Program Enrichment* project was a Six Sigma endeavor to better define the cyclical process of meaningful data collection for course evaluation and timely reviews. Current strengths, weaknesses, opportunities and threats to the process were identified, resulting in the formation of a new process map and improved tools for document review and tracking. Through the use of Adobe Portfolio all documents were compiled to establish a new end of course Faculty Reflection Packet.
Date:	AY 2011-12
Results:	Full and part-time faculty complete electronic portfolios. Portfolios are used as an internal form of communication focused on course improvement as well being an assigned location for data collection and course evaluation documentation. (See Figure 4.2.)

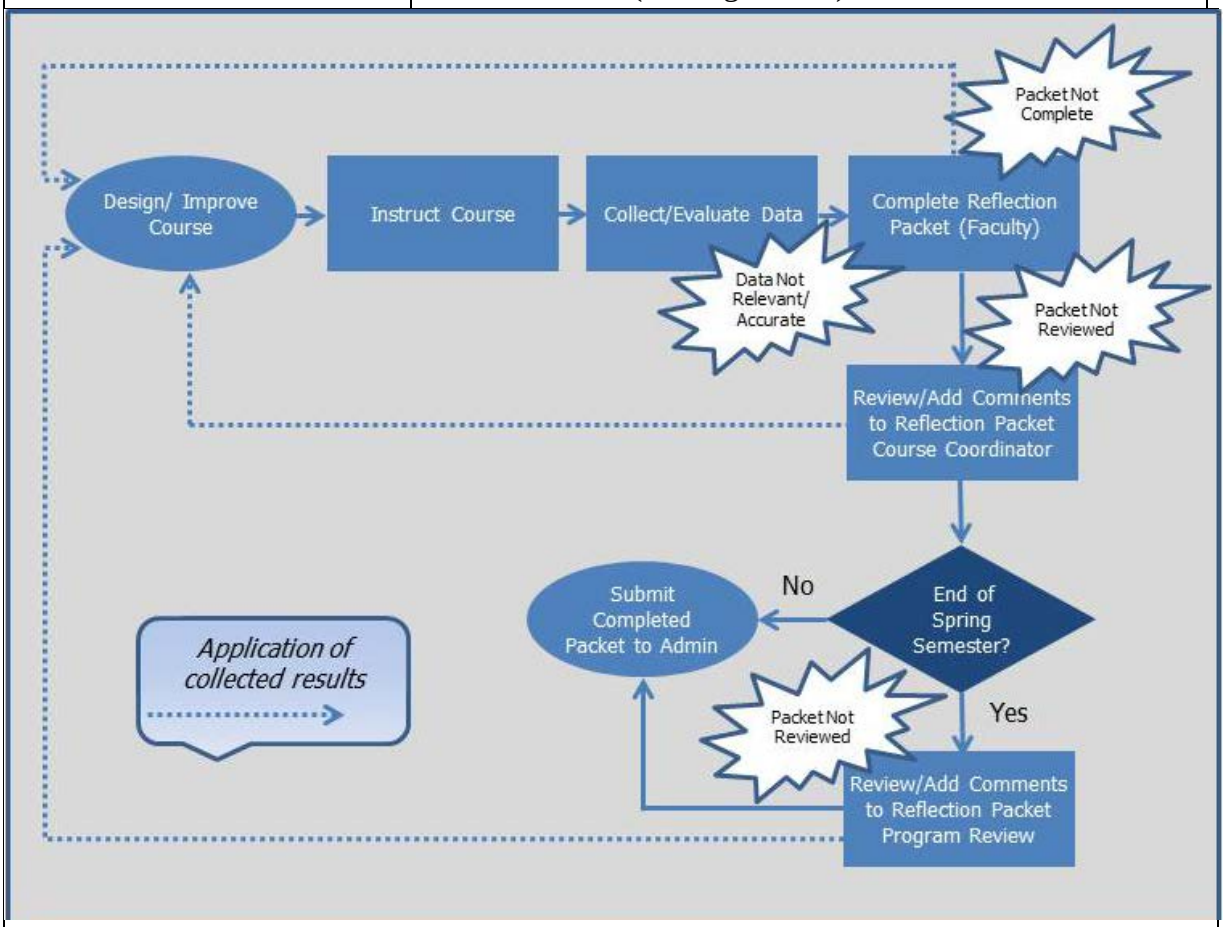

Figure 4.2: Program Enrichment Process Map for Course Assessment and Improvement

Action Taken:	Revision of TECH 105 (Intro to Engineering Technology)
Basis for Action:	Feedback from instructors of upper-level classes on foundational skills that needed strengthening
Date:	2012-13
Results:	In-class activities have been revised to provide more opportunities for active learning that reinforces key concepts and skills, including using spreadsheets; developing a PowerPoint presentation; and documenting sources. The full impacts of these improvements will be difficult to assess until the students reach their upper-level classes

Action Taken:	New Lean Six-Sigma certificate program launched, and Quality certificate reinvigorated
Basis for Action:	Suggestion from the Industrial Advisory Board for MET
Date:	2012-13
Results:	Because these certificate programs are only recently launched/updated, their impacts have not yet been fully assessed. However, their development addresses a concern raised during the previous ABET accreditation visit that the Mechanical Engineering Technology program was not taking sufficient advantage of its Industrial Advisory Board for suggestions on how best to serve the needs of students and industrial constituents.

Action Taken:	Implemented summer Industrial Projects class
Basis for Action:	Suggestion from the Industrial Advisory Board for MET
Date:	2012-13
Results:	This course, which provides student teams a hands-on project from industry, gives students more multidisciplinary team experience and the opportunity to develop professionalism skills. Additional impacts have not yet been fully assessed.

Targets for Future Improvement

In looking at how the PUL data for Engineering Technology programs correlated with the ABET learning outcomes, it was discovered that the mapping between PULs and ABET outcomes for Engineering Technology was somewhat out-of-date, using older versions of both the PULs and the ABET outcomes. This mapping is currently being revised and will be brought for discussion/feedback at the September meeting of the school Assessment Committee.

The Technology programs continue to wrestle with how best to achieve and assess ABET outcome g. an understanding of the need for and an ability to engage in self-directed continuing professional development;" In order to better prepare students for keeping abreast of new developments in the field, CEMT and BMET each require an upper-level class highlighting the latest techniques and technologies in their respective fields; and EET, CPET, and MET students are required to select one of their technical electives from the list of courses for the Sustainable Technologies certificate program.

Following a legislative mandate, all Engineering Technology programs have reduced their total credit hours to 120. The next few years of assessment of student and program outcomes will be particularly crucial to ensure that students are still well-prepared for the workforce even with a reduction in credit hours and associated course content.